

Metal Industry Indicators

Indicators of Domestic Primary Metals, Steel, Aluminum, and Copper Activity

March 2001

The coincident index for the primary metals industry, which gauges how the industry has actually performed, shows the primary metals industry in recession for the first time since 1990-91. A sharp drop in the primary metals leading index in February 2000 provided an early warning of this decline, which began to appear in the coincident index last summer.

The 6-month smoothed annualized growth rate of the coincident index declined 6 straight months, falling from 1.6% last June to -7.8% in December, a growth rate that was matched in January. Moreover, all three indicators in the coincident index are down sharply. Industrial production is off 11.0%, and total employee hours worked is down 8.5% from their recent highs of last April. The inflation-adjusted value of shipments has fallen 9.1% since its recent peak last June.

The falloff in economic activity in the broad primary metals industry is spread among the steel, copper, and aluminum industries. The coincident indexes for primary aluminum and steel have fallen 12.1% and 5.7%, respectively, from their recent highs in early 2000, while primary copper activity is down 6.3% since November 1998. However, the aluminum mill products industry has held up better, with its coincident index slipping only 2.4% from a recent high last April.

The **primary metals leading index** fell 0.9% in February, down to 121.1 from a revised 122.2 in January. The index's 6-month smoothed growth rate, a compound annual rate that measures the near-term trend, moved down to -6.1% from a revised -5.5% in January. Normally, a growth rate below -1.0% signals a downward near-term trend for future growth in metals activity, while a growth rate above +1.0% signals an upward trend.

Only four of the index's eight components were available in time to calculate the February leading index, so it should be considered preliminary. Three components moved lower in February, with the length of the average workweek in primary metals establishments making the largest negative contribution. In fact, the workweek component is now at its lowest level since May 1991, just 2 months after the end of the industry's last recession. The JOC-ECRI metals price index growth rate and the S&P stock price index for diversified machinery companies posted modest decreases. However, the Purchasing Managers' Index recorded its first increase since February of last year. The growth rate of the primary metals leading index points to further declines in domestic primary metals activity in the coming months.

The **other metal industry leading indexes** all moved up in January, the latest month for which they are available. The increases ranged from 1.3% for the aluminum mill products leading index to 0.2% for the steel leading index. However, the growth rates of the steel, primary aluminum, and copper leading indexes are all well below -1.0%, and continue to signal near-term declines in their respective industries. Only the aluminum mill products leading index growth rate, at +1.9% in January, suggests the possibility of a bottoming out of the recent decline in industry activity.

An increase in the index of new private housing permits in the United States was a major factor in pushing the steel, aluminum mill products, and copper leading indexes higher in January. The aluminum mill products leading index was also boosted by a strong gain in the length of the average workweek in aluminum sheet, plate, and foil establishments. Growth in the S&P stock price index for building materials companies helped to push up the January copper leading index, which gained 0.4%. The housing permits index is not a component in the primary aluminum leading index, which moved up 1.1% in January, bolstered by solid gains in five of its seven components.

Higher Metal Prices Not Likely Despite Increase in Metals Price Leading Index

The **metals price leading index** advanced 1.2% in January to 102.1 from a revised 100.9 in December, marking the index's first increase in 7 months. Its 6-month smoothed growth rate increased to -5.8% from a revised -8.8% in December.

As is usually the case, only three of the index's four components were available to compute the latest monthly value. The growth rate of the index measuring the trade-weighted average exchange value of other major currencies against the U.S. dollar was the largest factor in the index increase. The yield spread between the U.S. 10-year Treasury Note and the federal funds rate also made a sizable positive contribution to the increase in the leading index, while the third available component, the growth rate of the inflation-adjusted value of new orders for U.S. nonferrous metals, was little changed from December.

The fourth index component, the growth rate of the Economic Cycle Research Institute's 16-Country Long Leading Index, was available only through December, when it declined for the seventh time in 8 months. Despite its increase in January, the growth rate of the metals price leading index continues to signal little or no growth in most metal prices in the coming months.

The 6-month smoothed growth rate of the inflation-adjusted value of inventories of U.S. nonferrous metal products moved up to 4.1% in January from 2.0% in December. Furthermore, the actual level of these inventories is at a 19-month high. These inventories have an inverse relationship with prices, meaning an inventory increase tends to point to lower prices.

The business cycle and inventories are only two factors in metals price determination. Other factors that affect prices include changes in metals production, speculation, foreign exchange rates, stockpiling, political instability, and production costs.

Table 1.
Leading Index of Metal Prices and Growth Rates of the Nonferrous Metals Price Index, Inventories of Nonferrous Metal Products, and Selected Metal Prices

	Leading Index of Metal Prices (1967=100)	Six-Month Smoothed Growth Rates				
		MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982\$)	Primary Aluminum	Primary Copper	Steel Scrap
2000						
January	109.2r	39.7	-2.3	52.1	29.7	55.2
February	107.5r	13.4	-4.7	20.6	7.6	22.7
March	107.4r	7.6	-2.6	9.6	9.8	19.8
April	107.3r	0.2	-1.8	-1.7	4.9	15.7
May	106.2r	-2.4	-1.7	-4.9	4.9	-1.9
June	106.4r	5.4	-1.6	6.9	5.2	-13.7
July	105.3	5.1	-0.8	3.3	12.4	-20.5
August	105.2r	6.6	-1.7	4.4	13.9	-23.2
September	104.2r	8.9	-2.8r	4.5	21.7	-22.4
October	102.7r	-4.9	-1.3	-8.4	5.7	-37.0
November	102.3r	-4.7	4.2r	-5.7	1.8	-45.6
December	100.9r	-0.5	2.0	2.1	-0.7	-35.9
2001						
January	102.1	13.7	4.1	22.7	-0.8	-20.4
February	NA	-0.5	NA	3.0	-5.8	-34.0

NA: Not available r: Revised

Note: The components of the Leading Index of Metal Prices are the spread between the U.S. 10-year Treasury Note and the federal funds rate, and the 6-month smoothed growth rates of the deflated value of new orders for nonferrous metals, the Economic Cycle Research Institute's 16-Country Long Leading Index, and the reciprocal of the trade-weighted average exchange value of the U.S. dollar against other major currencies. The Metal Industry Indicators (MII) Nonferrous Metals Price Index measures changes in end-of-the-month prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange (LME). The steel scrap price used is the price of No. 1 heavy melting. Inventories consist of the deflated value of finished goods, work in progress, and raw materials for U.S.-produced nonferrous metals and nonferrous metal products. Six-month smoothed growth rates are based on the ratio of the current month's index or price to its average over the preceding 12 months, expressed at a compound annual rate.

Sources: U.S. Geological Survey (USGS); American Metal Market (AMM); the London Metal Exchange (LME); U.S. Census Bureau; the Economic Cycle Research Institute, Inc. (ECRI); and Federal Reserve Board.

**CHART 1.
LEADING INDEX OF METAL PRICES AND GROWTH RATES
OF NONFERROUS METALS PRICE INDEX, INVENTORIES OF
NONFERROUS METAL PRODUCTS, AND SELECTED PRICES**

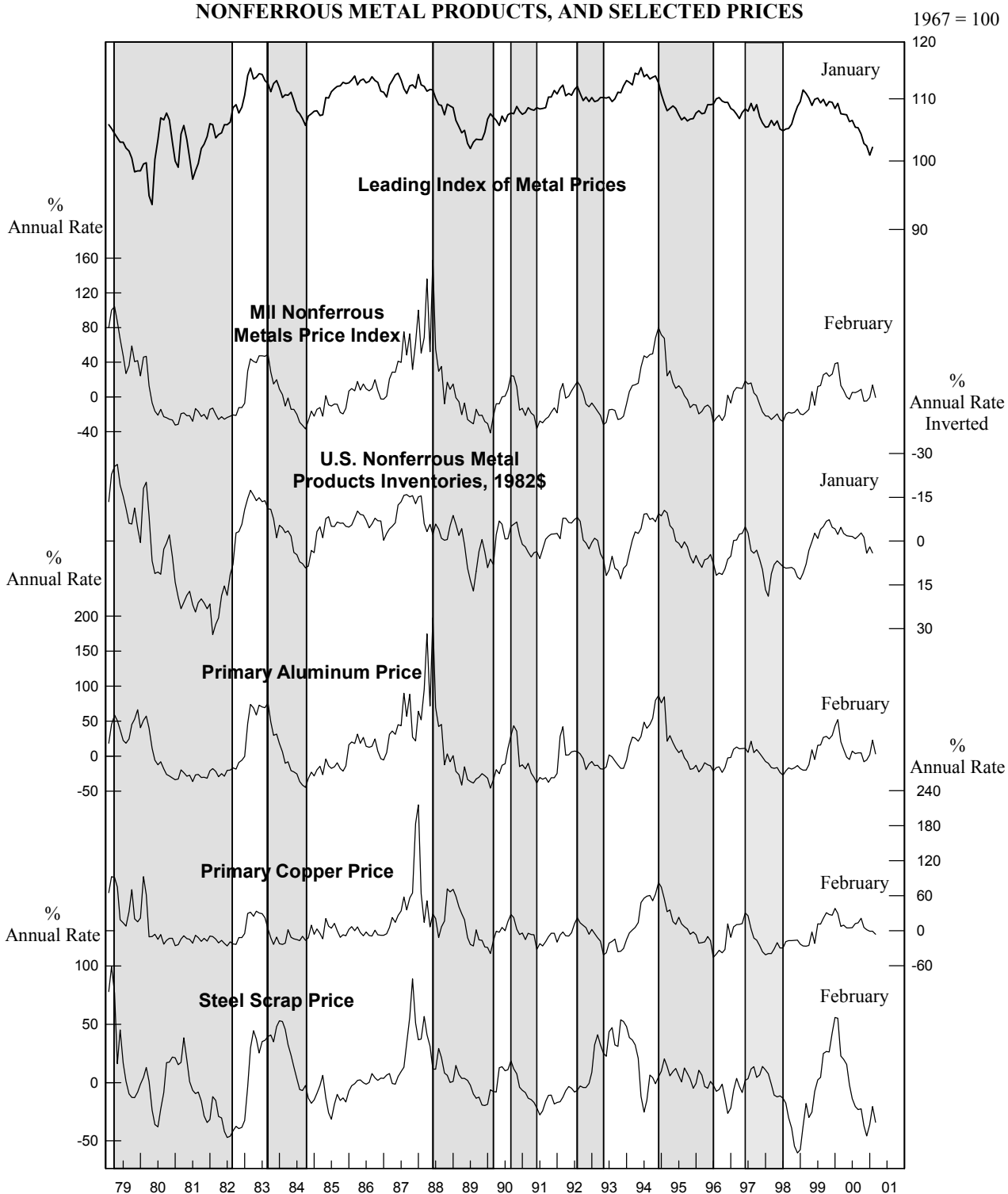


Table 2.
The Primary Metals Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2000				
March	127.3r	-2.7r	116.4	3.4
April	128.6r	-1.1r	116.8	3.6
May	127.1r	-3.3	115.9	1.5
June	126.0r	-4.7r	116.3	1.6
July	125.3r	-5.2r	116.1r	1.0r
August	124.8r	-5.4r	115.2	-0.7
September	125.5r	-3.9r	114.9	-1.2
October	123.4	-6.3r	114.1r	-2.5r
November	123.1	-6.1r	113.6r	-3.3r
December	121.5r	-7.5r	110.6r	-7.8r
2001				
January	122.2r	-5.5r	110.2	-7.8
February	121.1	-6.1	NA	NA

NA: Not available r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 3.
The Contribution of Each Primary Metals Index Component to the Percent Change in the Index from the Previous Month

Leading Index	January	February
1. Average weekly hours, primary metals (SIC 33)	0.0r	-0.9
2. S&P stock price index, machinery, diversified	0.1	-0.1
3. Ratio of price to unit labor cost (SIC 33)	-0.1	NA
4. JOC-ECRI metals price index growth rate	0.1r	-0.1
5. New orders, primary metals, (SIC 33) 1982\$	0.0	NA
6. Index of new private housing units authorized by permit	0.7	NA
7. Growth rate of U.S. M2 money supply, 1996\$	0.2	NA
8. Purchasing Managers' Index	-0.5r	0.2
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.5r	-0.9
Coincident Index	December	January
1. Industrial production index, primary metals (SIC 33)	-0.5r	-0.1
2. Total employee hours, primary metals (SIC 33)	-1.4r	-0.4
3. Value of shipments, primary metals, (SIC 33) 1982\$	-0.8	0.0
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-2.6r	-0.4

Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's; 3, U.S. Geological Survey; 4, Journal of Commerce and Economic Cycle Research Institute, Inc.; 5, U.S. Census Bureau and U.S. Geological Survey; 6, U.S. Census Bureau and U.S. Geological Survey; 7, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 8, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, U.S. Census Bureau and U.S. Geological Survey. All series are seasonally adjusted, except 2, 3, and 4 of the leading index.

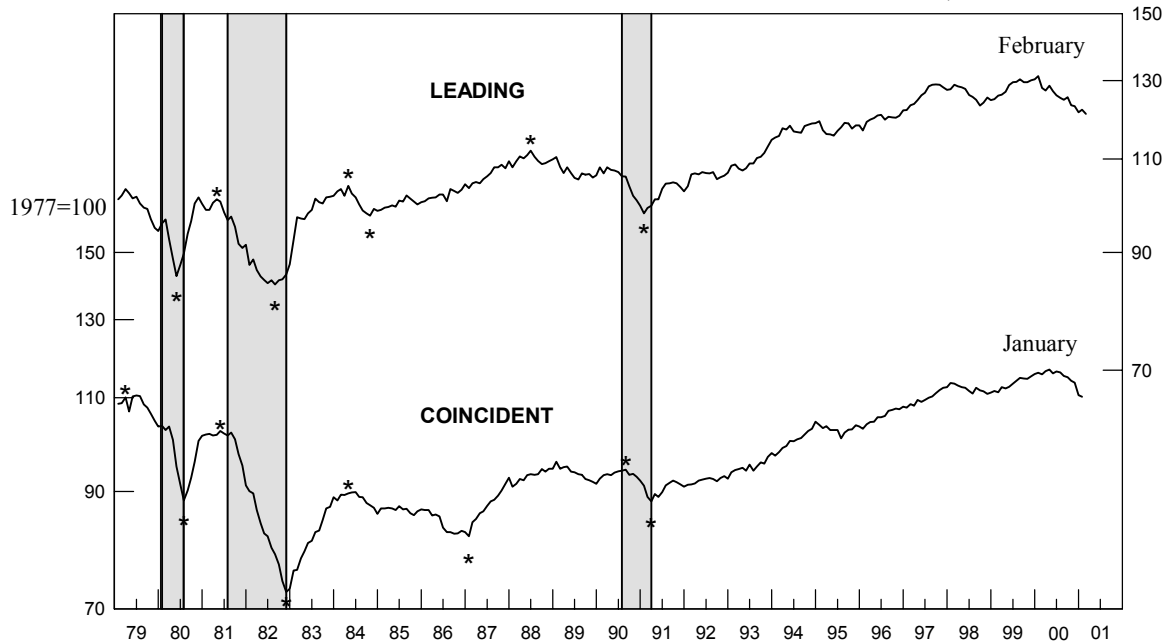
NA: Not available r: Revised

Note: A component's contribution, shown in Tables 3, 5, 7, and 9, measures its effect, in percentage points, on the percent change in the index. Each month, the sum of the contributions plus the trend adjustment equals (except for rounding differences) the index's percent change from the previous month.

CHART 2.

PRIMARY METALS: LEADING AND COINCIDENT INDEXES, 1979-2001

1977=100

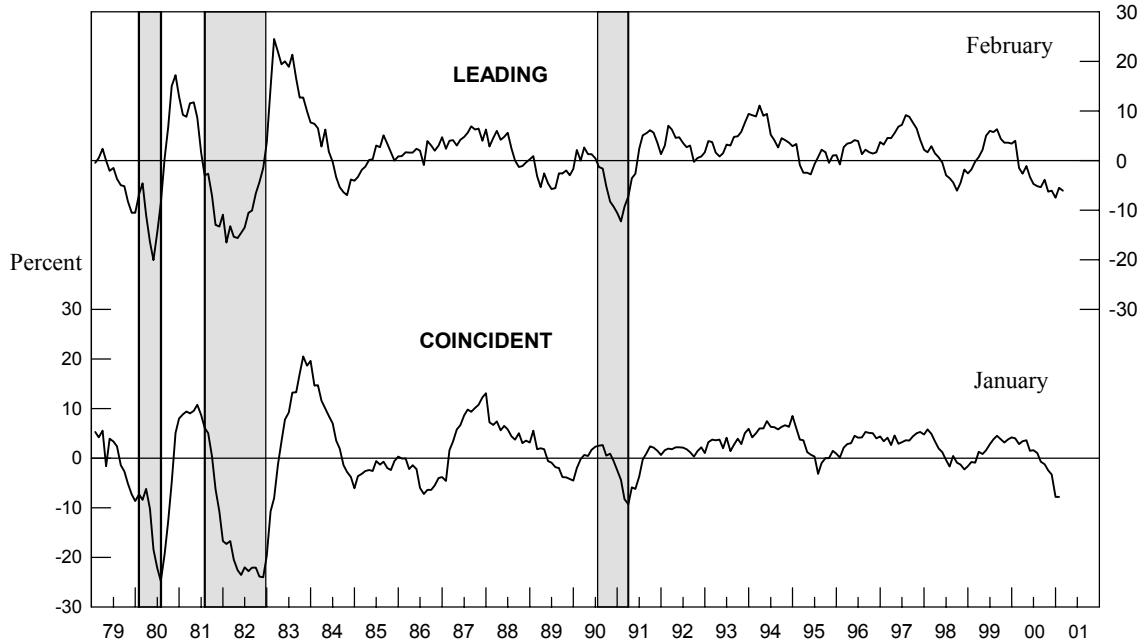


Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 3.

PRIMARY METALS: LEADING AND COINCIDENT GROWTH RATES, 1979-2001

Percent



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

Table 4.
The Steel Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2000				
February	111.9r	-1.0r	103.4	4.0
March	111.1r	-2.3r	104.0	4.2
April	110.6r	-3.2r	103.4	2.3
May	109.8r	-4.3	103.2	1.5
June	108.6r	-6.0	103.5	1.5
July	107.1r	-7.8r	103.1	0.3
August	107.3r	-6.8r	102.5	-1.1
September	107.5r	-5.7	102.3	-1.5
October	105.2r	-8.8r	101.1	-3.6
November	104.9	-8.4r	100.5	-4.5
December	103.5r	-9.6	98.2r	-8.2r
2001				
January	103.7	-8.1	98.1	-7.6

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 5.
The Contribution of Each Steel Index Component to the Percent Change in the Index from the Previous Month

Leading Index		December	January
1. Average weekly hours, blast furnaces and basic steel products (SIC 331)		-0.7	-0.4
2. New orders, steel works, blast furnaces, and rolling and finishing mills, 1982\$, (SIC 331)		-0.2	0.1
3. Shipments of household appliances, 1982\$		0.1r	0.2
4. S&P stock price index, steel companies		0.1	0.0
5. Industrial production index for automotive products		-0.3r	-0.4
6. Growth rate of the price of steel scrap (#1 heavy melting, \$/ton)		0.1	0.3
7. Index of new private housing units authorized by permit		-0.3	0.7
8. Growth rate of U.S. M2 money supply, 1996\$		0.3r	0.2
9. Purchasing Managers' Index		-0.5	-0.5
Trend adjustment		0.0	0.0
Percent change (except for rounding differences)		-1.4r	0.2
Coincident Index			
1. Industrial production index, basic steel and mill products (SIC 331)		-0.4r	0.0
2. Value of shipments, steel works, blast furnaces, and rolling and finishing mills (SIC 331), 1982\$		-1.1	0.5
3. Total employee hours, blast furnaces and basic steel products (SIC 331)		-0.9	-0.7
Trend adjustment		0.1	0.1
Percent change (except for rounding differences)		-2.3r	-0.1

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, U.S. Census Bureau and U.S. Geological Survey; 4, Standard & Poor's; 5, Federal Reserve Board; 6, Journal of Commerce and U.S. Geological Survey; 7, U.S. Census Bureau and U.S. Geological Survey; 8, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 9, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted, except 4 and 6 of the leading index.

r: Revised

CHART 4.
STEEL: LEADING AND COINCIDENT INDEXES, 1979-2001

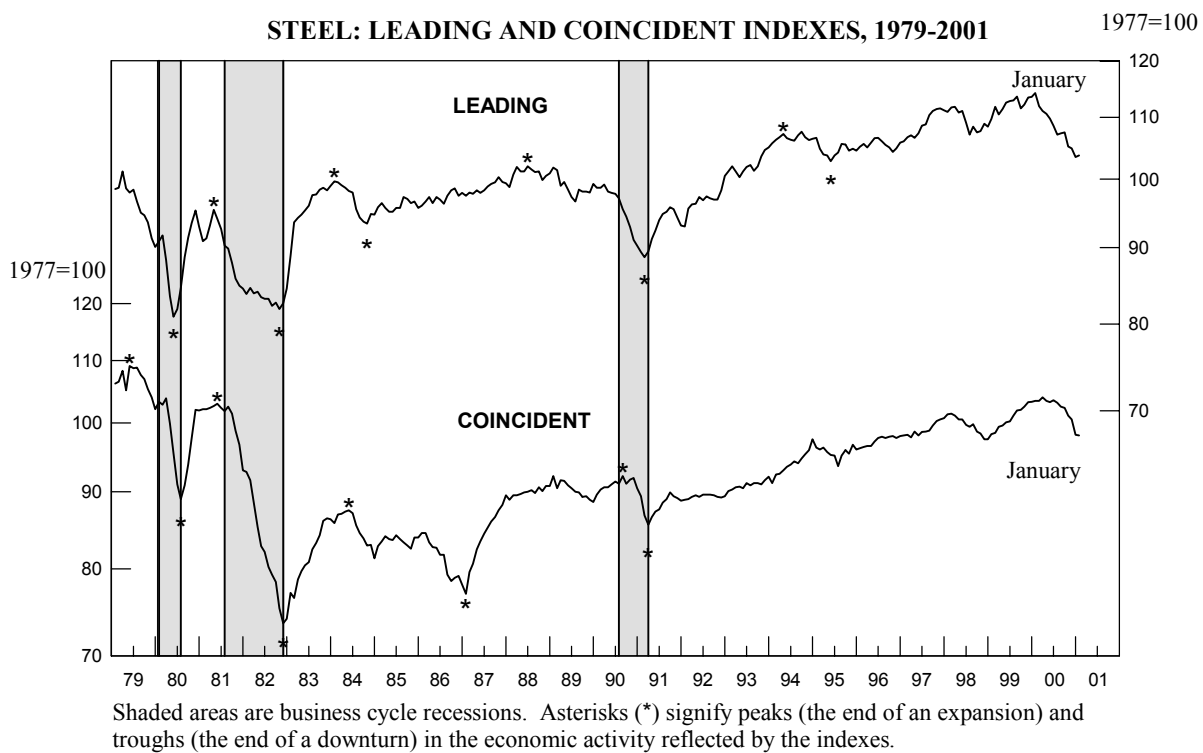


CHART 5.
STEEL: LEADING AND COINCIDENT GROWTH RATES, 1979-2001

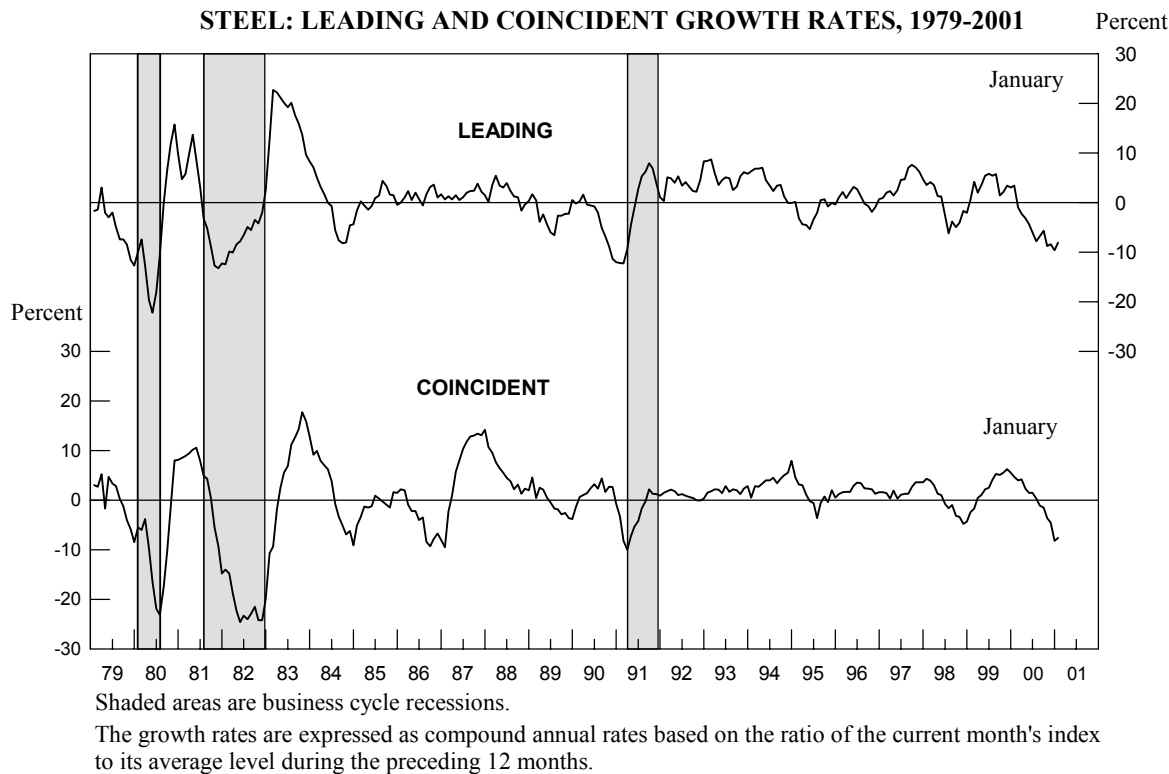


Table 6.
The Aluminum Mill Products Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2000				
February	158.8r	1.6r	143.0	1.5
March	159.0r	1.5r	143.0	0.9
April	159.9r	2.3r	144.7	2.8
May	157.8r	-0.6r	144.2	1.7
June	157.6r	-0.8r	142.5	-0.8
July	154.4r	-4.4r	144.0	1.2
August	158.2r	0.4r	142.4	-1.1
September	160.3r	3.0r	141.2	-2.3
October	157.7r	-0.2r	140.4r	-3.2r
November	158.0r	-0.1r	140.3r	-3.2r
December	157.8r	-0.5r	140.2r	-3.2r
2001				
January	159.8	1.9	141.2	-1.6

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

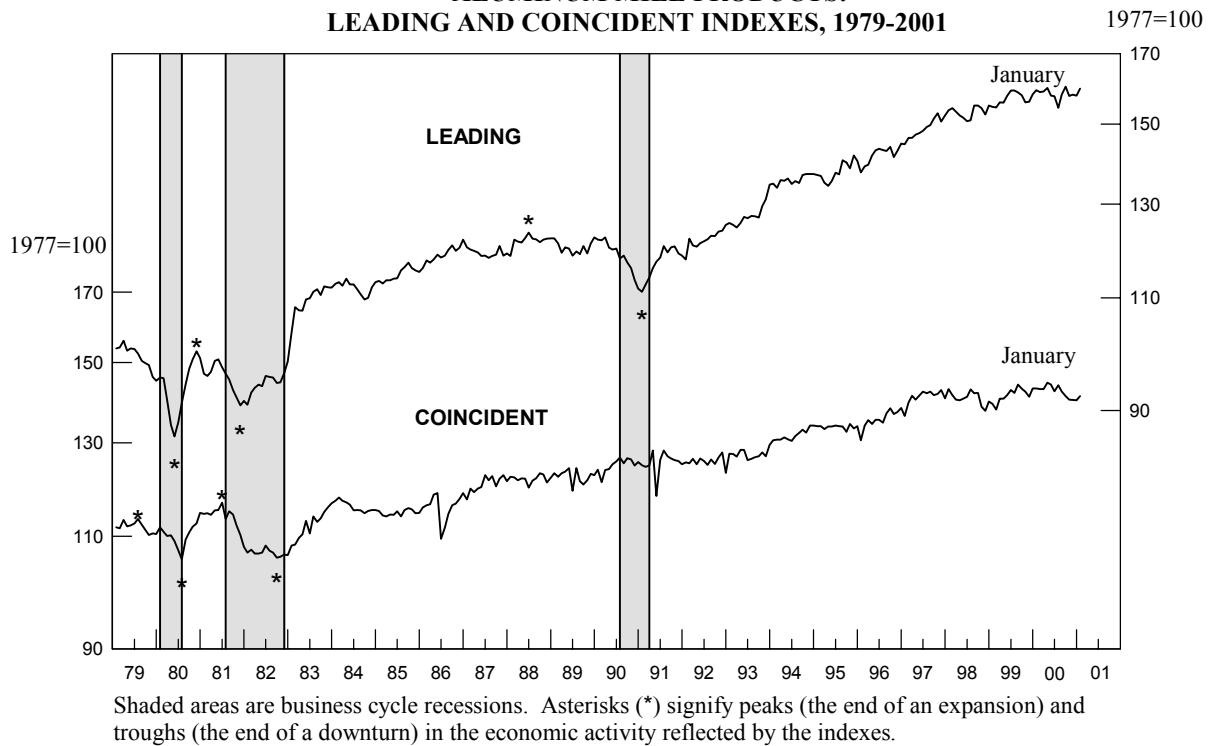
Table 7.
The Contribution of Each Aluminum Mill Products Index Component to the Percent Change in the Index from the Previous Month

Leading Index	December	January
1. Average weekly hours, aluminum sheet, plate, and foil (SIC 3353)	0.3r	1.1
2. Index of new private housing units authorized by permit	-0.4	0.8
3. Industrial production index for automotive products	-0.3	-0.5
4. Construction contracts, commercial and industrial (square feet)	0.7	0.4
5. Net new orders for aluminum mill products (pounds)	-0.3	-0.3
6. Growth rate of U.S. M2 money supply, 1996\$	0.4r	0.2
7. Purchasing Managers' Index	-0.6	-0.6
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.1r	1.2
Coincident Index		
1. Industrial production index, aluminum sheet, plate, and foil (SIC 3353)	-0.2r	0.4
2. Total employee hours, aluminum sheet, plate, and foil (SIC 3353)	0.0r	0.2
Trend adjustment	0.2	0.2
Percent change (except for rounding differences)	0.0	0.8

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Federal Reserve Board; 4, F.W. Dodge, Division of McGraw-Hill Information Systems Company; 5, The Aluminum Association, Inc. and U.S. Geological Survey; 6, Federal Reserve Board, Conference Board, and U.S. Geological Survey; 7, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted.

r: Revised

**CHART 6.
ALUMINUM MILL PRODUCTS:
LEADING AND COINCIDENT INDEXES, 1979-2001**



**CHART 7.
ALUMINUM MILL PRODUCTS:
LEADING AND COINCIDENT GROWTH RATES, 1979-2001**

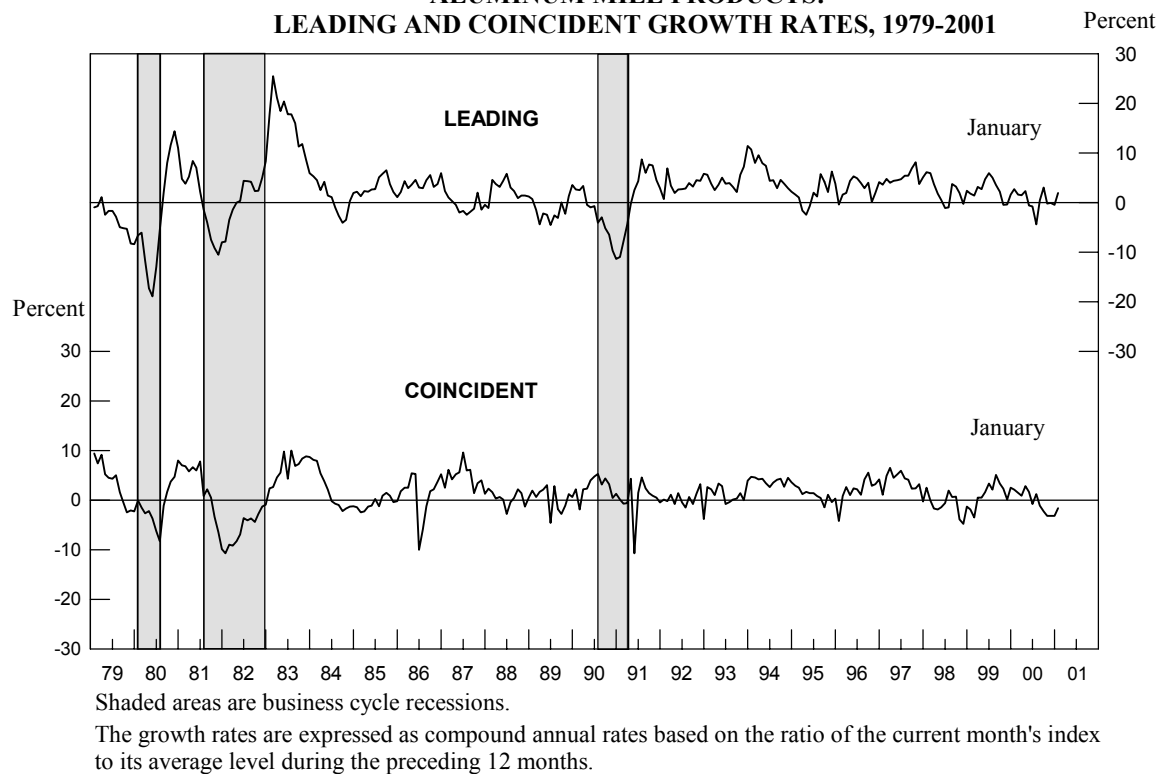


Table 8.
The Copper Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2000				
February	128.1	-4.2	122.6	-2.1
March	128.2	-3.9	122.8	-1.3
April	129.2	-2.5	120.9	-3.6
May	129.1	-2.5	123.3	0.7
June	128.0	-3.9	122.8	0.1
July	127.1	-4.5	121.6	-1.5
August	127.0	-4.0	121.2	-1.6
September	127.2	-3.0r	121.6	-0.7
October	123.7	-7.3	121.0r	-1.5r
November	124.5	-5.3	122.0r	0.2r
December	124.6r	-4.6r	119.8r	-3.1r
2001				
January	125.1	-3.2	120.1	-2.4

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 9.
The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

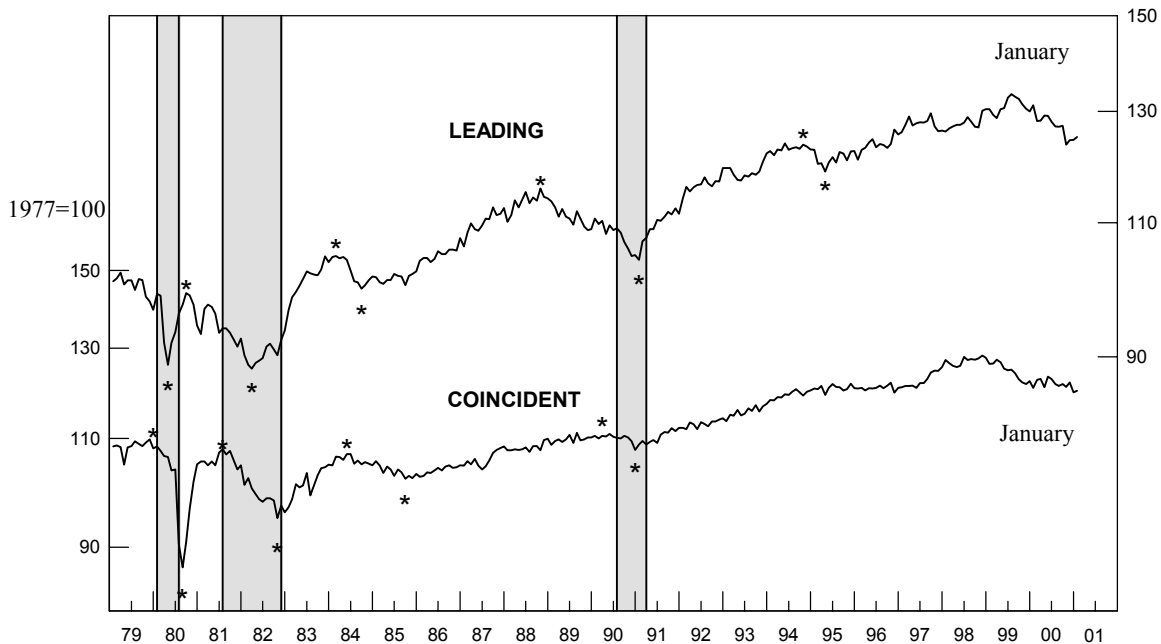
Leading Index	December	January
1. Average weekly overtime hours, rolling, drawing, and extruding of copper (SIC 3351)	-0.3r	-0.4
2. New orders, nonferrous and other primary metals, 1982\$	-0.4r	0.0
3. S&P stock price index, building materials companies	1.2	0.5
4. Ratio of shipments to inventories, electronic and other electrical equipment (SIC 36)	0.2r	-0.7
5. LME spot price of primary copper	0.0	0.0
6. Index of new private housing units authorized by permit	-0.4	0.8
7. Spread between the U.S. 10-year Treasury Note and the federal funds rate	-0.3	0.3
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.0r	0.5
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (SIC 3331)	0.0r	0.1
2. Total employee hours, rolling, drawing, and extruding of copper (SIC 3351)	-2.2r	0.5
3. Copper refiners' shipments (short tons)	0.4	-0.4
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-1.7r	0.3

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Standard & Poor's; 4, Census Bureau and U.S. Geological Survey; 5, London Metal Exchange; 6, U.S. Census Bureau and U.S. Geological Survey; 7, Federal Reserve Board and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics; 3, American Bureau of Metal Statistics, Inc. and U.S. Geological Survey. All series are seasonally adjusted, except 3, 5, and 7 of the leading index.

r: Revised

CHART 8.
COPPER: LEADING AND COINCIDENT INDEXES, 1979-2001

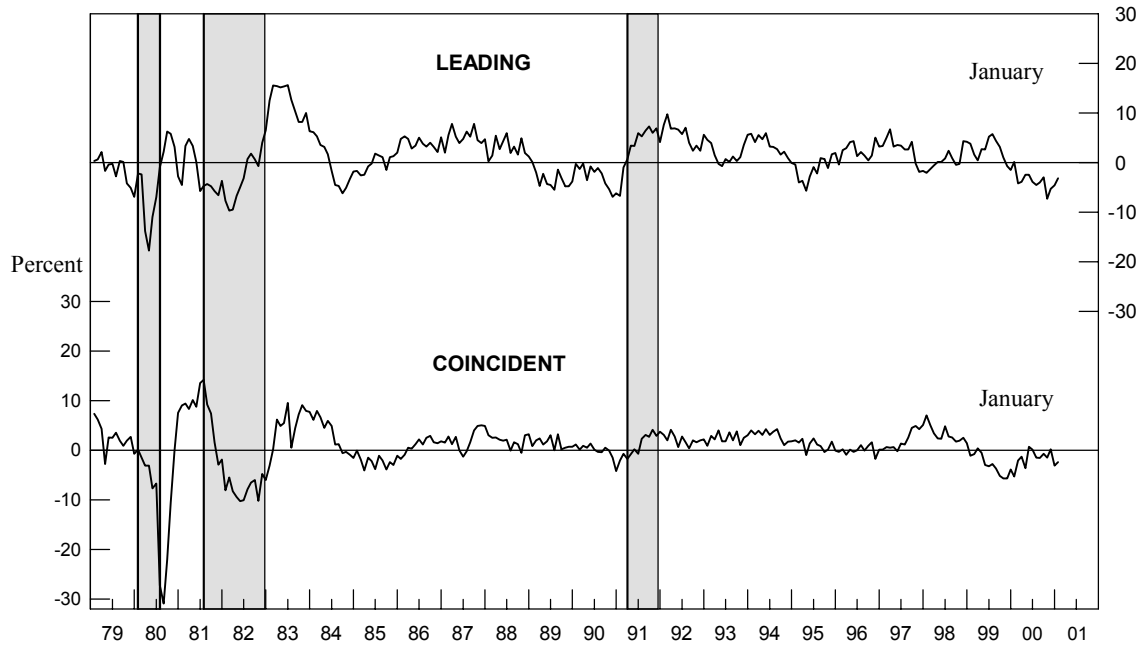
1977=100



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 9.
COPPER: LEADING AND COINCIDENT GROWTH RATES, 1979-2001

Percent



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

Explanation

Each month, the U.S. Geological Survey tracks the effects of the business cycle on five U.S. metal industries by calculating and publishing composite indexes of leading and coincident indicators. Wesley Mitchell and Arthur Burns originated the cyclical-indicators approach for the economy as a whole at the National Bureau of Economic Research in the mid-1930's. Over subsequent decades this approach was developed and refined, mostly at the National Bureau, under the leadership of Geoffrey H. Moore.¹

A business cycle can briefly be described as growth in the level of economic activity followed by a decline succeeded by further growth. These alternating periods of growth and decline do not occur at regular intervals. Composite indexes, however, can help determine when highs and lows in the cycle might occur. A composite index combines cyclical indicators of diverse economic activity into one index, giving decision makers and economists a single measure of how changes in the business cycle are affecting economic activity.

The indicators in the metal industry leading indexes historically give signals several months in advance of major changes in a coincident index, a measure of current metal industry activity. Indicators that make up the leading indexes are, for the most part, measures of anticipations or new commitments to various economic activities that can affect the metal industries in the months ahead.

Composite coincident indexes for the metal industries consist of indicators for production, shipments, and total employee hours worked. As such, the coincident indexes can be regarded as measures of the economic health of the metal industries.

Four of the metal industry coincident indexes, those for primary metals, steel, primary aluminum, and aluminum mill products, reflect their classifications in the U.S. Standard Industrial Classification (SIC). The SIC is the main classification used by the United States government and industry in collecting and tabulating economic statistics. The coincident index for copper is a blend of two different copper industries, primary smelting and refining of copper and rolling, drawing, and extruding of copper.

Of the five metal industries, primary metals is the broadest, consisting of 26 different metal processing industries. The steel, aluminum, and copper industries are parts of the primary metals industry.

The metal industry leading indexes turn before their respective coincident indexes an average of 9 months for primary metals and 8 months for steel and copper. The average lead time for the primary aluminum leading index is 6 to 8 months, and the average lead time for the aluminum mill products leading index is 6 months.

¹Business Cycle Indicators, A monthly report from The Conference Board (March 1996).

The leading index of metal prices, also published in the *Metal Industry Indicators*, is designed to signal changes in a composite index of prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange. On average, this leading index indicates significant changes in price growth about 8 months in advance.

The growth rate used in the *Metal Industry Indicators* is a 6-month smoothed growth rate at a compound annual rate, calculated from a moving average. Moving averages smooth fluctuations in data over time so that trends can be observed. The 6-month smoothed growth rate is based upon the ratio of the latest monthly value to the preceding 12-month moving average.

$$\left[\left(\frac{\text{current value}}{\text{preceding 12-month moving average}} \right)^{\frac{12}{6.5}} - 1.0 \right] * 100$$

Because the interval between midpoints of the current month and the preceding 12 months is 6.5 months, the ratio is raised to the 12/6.5 power to derive a compound annual rate.

The growth rates measure the near-term industry trends. They, along with other information about the metal industries and the world economy, are the main tools used to determine the outlook of the industries. A 6-month smoothed growth rate above +1.0% usually means increasing growth; a rate below -1.0% usually means declining growth.

The next summary is scheduled for release on MINES FaxBack at 10:00 a.m. EDT, Friday, April 20. Access MINES FaxBack from a touch-tone telephone attached to a fax machine by dialing 703-648-4999. The address for *Metal Industry Indicators* on the World Wide Web is: <http://minerals.usgs.gov/minerals/pubs/mii/>

The *Metal Industry Indicators* is produced at the U.S. Geological Survey by the Minerals Information Team. The report is prepared by Kenneth Beckman (703-648-4916), e-mail (kbeckman@usgs.gov), and Gail James (703-648-4915), e-mail (gjames@usgs.gov). The former Center for International Business Cycle Research, under the direction of Dr. Geoffrey H. Moore, and the former U.S. Bureau of Mines developed the metal industry leading and coincident indexes in the early 1990's. Customers can send mail concerning the *Metal Industry Indicators* to the following address:

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Minerals Information Team
988 National Center
Reston, Virginia 20192